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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/923,274	08/06/2001	William R. Bidermann	1039.013	9059

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EXAMINER

LUU, THANH X

ART UNIT PAPER NUMBER

2878

DATE MAILED: 04/23/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/923,274

Applicant(s)

BIDERMANN ET AL.

Examiner

Thanh X Luu

Art Unit

2878

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-34 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-34 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 06 August 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). ____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) ____ 6) ☐ Other:

DETAILED ACTION

Specification

1. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

Drawings

2. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the photoelement configured to generate a digital electrical signal must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

4. Claims 13-34 are rejected under 35 U.S.C. 112, first paragraph, as containing ~~subject matter which was not described in the specification in such a way as to enable~~ one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. Photoelements generate an analog signal. Applicant does not describe or show how to make and use a photoelement that is configured to generate a digital signal.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 1-3 and 7-9 are rejected under 35 U.S.C. 102(b) as being anticipated by Tani et al. (U.S. Patent 5,282,041).

Regarding claims 1-3 and 7-9, Tani et al. disclose (see Figure 2B) an integrated circuit and method having an image sensor, wherein the image sensor has an array of one or more pixels, wherein at least one pixel in the array comprises: a photoelement (PD 11a) formed on a substrate and configured to generate an electrical signal in response to incident light; and associated circuitry (11b) formed on the substrate and configured to process the electrical signal generated in the photoelement, wherein at least part of the photoelement and at least part of the associated circuitry are formed within a common insulating layer (PSG) formed on the substrate, wherein a portion of the common insulating layer corresponding to the photoelement has a thickness different from a thickness of a portion of the common insulating layer corresponding to the associated circuitry. Tani et al. also disclose (see Figure 2B) the common insulating layer corresponding to the associated circuitry is thicker. Tani et al. further disclose (see Figure 2B) the pixel further comprises a mask layer (light shield) that inhibits light incident at the associated circuitry from contributing to the electrical signal at the photoelement.

7. Claims 1, 3, 4, 6, 7, 9, 10 and 12 are rejected under 35 U.S.C. 102(b) as being anticipated by the publication of Sasaki (JP 11-284169, published October 15, 1999).

Regarding claims 1, 3, 4, 6, 7, 9, 10 and 12, Sasaki discloses (see Figure 2) an integrated circuit and method having an image sensor, wherein the image sensor has an array of one or more pixels, wherein at least one pixel in the array comprises: a photoelement (11) formed on a substrate and configured to generate an electrical signal in response to incident light; and associated circuitry (72-75) formed on the substrate and configured to process the electrical signal generated in the photoelement, wherein at least part of the photoelement and at least part of the associated circuitry are formed within a common insulating layer (81) formed on the substrate, wherein a portion of the common insulating layer corresponding to the photoelement has a thickness different from a thickness of a portion of the common insulating layer corresponding to the associated circuitry. Sasaki further discloses (see Figure 2) the pixel further comprises a mask layer (82) that inhibits light incident at the associated circuitry from contributing to the electrical signal at the photoelement. Sasaki also discloses (see Figure 2) one or more insulating structures (61) formed on the substrate, wherein the structures inhibit flow of electricity between at least one of the photoelement and the associated circuitry or the pixel and the adjacent pixel in the array.

8. Claims 1 and 7 are rejected under 35 U.S.C. 102(b) as being anticipated by Koyama (U.S. Patent 5,323,052).

Regarding claims 1 and 7, Koyama discloses (see Figure 1) an integrated circuit and method having an image sensor, wherein the image sensor has an array of one or

more pixels, wherein at least one pixel in the array comprises: a photoelement (3) formed on a substrate and configured to generate an electrical signal in response to incident light; and associated circuitry (6) formed on the substrate and configured to process the electrical signal generated in the photoelement, wherein at least part of the photoelement and at least part of the associated circuitry are formed within a common insulating layer (5) formed on the substrate, wherein a portion of the common insulating layer corresponding to the photoelement has a thickness different from a thickness of a portion of the common insulating layer corresponding to the associated circuitry.

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. Claims 13, 17, 18, 20-24, 28, 29 and 31-34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sasaki.

Regarding claims 13, 17, 18, 20-22, 24, 28, 29 and 31-33, Sasaki discloses (see Figure 2) an integrated circuit and method having an image sensor, wherein the image sensor has an array of one or more pixels, wherein at least one pixel in the array comprises: a photoelement (11) formed on a substrate and configured to generate an electrical signal in response to incident light; and associated circuitry (72-75) formed on the substrate and configured to process the electrical signal generated in the photoelement; and one or more insulating structures (61) formed on the substrate,

wherein the structures inhibit flow of electricity between at least one of the photoelement and the associated circuitry or the pixel and the adjacent pixel in the array. Sasaki also discloses (see Figure 2) the insulating structures comprise a lateral insulating structure between the photoelement and the associated circuitry or between the pixel and the adjacent pixel in the array. Sasaki further discloses (see Figure 2) the pixel further comprises a mask layer (82) that inhibits light incident at the associated circuitry from contributing to the electrical signal at the photoelement. In addition, Sasaki discloses (see Figure 2) wherein at least part of the photoelement and at least part of the associated circuitry are formed within a common insulating layer (81) formed on the substrate, wherein a portion of the common insulating layer corresponding to the photoelement has a thickness different from a thickness of a portion of the common insulating layer corresponding to the associated circuitry. Sasaki does not specifically disclose the pixel as a digital pixel. However, digital pixels are well known. Further, it is notoriously well known that digital signals are more robust than analog signals. Thus, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to provide a digital pixel and image sensor in the apparatus and method of Sasaki to provide more robust signals and improve detection.

Regarding claims 23 and 34, Sasaki discloses the claimed invention as set forth above. Sasaki does not specifically disclose the thickness of the insulating layer is thicker over the associated circuitry. However, choosing the thickness is a matter of design choice. It would have been obvious to a person of ordinary skill in the art at the time the invention was made to provide a thinner layer over the photoelement in the

apparatus and method of Sasaki to allow reduce the amount of material radiation has to travel through to impinge on the photoelement and therefore improve detection.

11. Claims 13-18 and 24-29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Saitoh et al. (U.S. Patent 6,001,667).

Regarding claims 13-18 and 24-29, Saitoh et al. disclose (see Figure 14) an integrated circuit and method having an image sensor, wherein the image sensor has an array of one or more pixels, wherein at least one pixel in the array comprises: a photoelement (11405) formed on a substrate and configured to generate an electrical signal in response to incident light; and associated circuitry (11411) formed on the substrate and configured to process the electrical signal generated in the photoelement; and one or more insulating structures (11401, 11404) formed on the substrate, wherein the structures inhibit flow of electricity between at least one of the photoelement and the associated circuitry or the pixel and the adjacent pixel in the array. Saitoh et al. further disclose (see Figure 14) the insulating structures comprise an insulating layer (11401) between the substrate and both the photoelement and the associated circuitry. Saitoh et al. also disclose (see Figure 14) the insulating structures (11404) comprise a lateral insulating structure between the photoelement and the associated circuitry or between the pixel and the adjacent pixel in the array. Saitoh et al. do not specifically disclose a digital pixel or image sensor. However, digital pixels are well known. Further, it is notoriously well known that digital signals are more robust than analog signals. Thus, it would have been obvious to a person of ordinary skill in the art at the time the invention

was made to provide a digital pixel and image sensor in the apparatus and method of Saitoh et al. to provide more robust signals and improve detection.

12. Claims 19 and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sasaki in view of Koyama.

Regarding claims 19 and 30, Sasaki discloses the claimed invention as set forth above. Sasaki further disclose the photoelement is a photodiode and the insulating layer is an oxide of silicon. Sasaki does not specifically disclose a microlens or a CMOS image sensor. Koyama teach (see Figure 1) a microlens (11) positioned over a photoelement to further concentrate light. Further, CMOS image sensors are well known. It would have been obvious to a person of ordinary skill in the art at the time the invention was made to provide a CMOS image sensor and a microlens in the apparatus of Sasaki in view of Koyama to improve detection and lower the cost and power consumption of the device.

13. Claims 5 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Koyama.

Regarding claims 5 and 11, Koyama discloses the claimed invention as set forth above. Koyama further disclose (see Figure 1) the insulating layer comprises an oxide of silicon; the pixel further comprises a microlens (11) positioned over the photoelement; and the photoelement is a photodiode. Koyama does not specifically disclose the image sensor is a CMOS image sensor. However, CMOS image sensors are notoriously well known in the art to provide low cost and low power detection. It would have been obvious to a person of ordinary skill in the art at the time the invention was

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made to provide a CMOS image sensor in the apparatus and method of Koyama to provide a device that costs less and consumes less power.


Conclusion

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thanh X. Luu whose telephone number is (703) 305-0539. The examiner can normally be reached on Monday-Friday from 6:30 AM - 4:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Porta, can be reached on (703) 308-4852. The fax phone number for the organization where the application or proceeding is assigned is (703) 308-7722.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

txl
April 16, 2003



Thanh X. Luu
Patent Examiner